

CLAIMS

1. A multi-beam satellite comprising:  
an input section to receive a plurality of first spot beams;  
an output section to transmit a plurality of second spot beams; and  
a payload architecture coupled between said input section and said output section, said payload architecture flexibly and selectively switching and filtering signals from said plurality of first spot beams received by said input section and routing the switched and filtered signals to said output section to be transmitted as said plurality of second spot beams.
2. The satellite of claim 1, wherein said payload architecture switches to select one of said plurality of first spot beams received by said input section to contain a gateway.
3. The satellite of claim 2, wherein said plurality of first spot beams includes primary beams and secondary beams.
4. The satellite of claim 3, wherein said payload architecture selects a primary beam to contain a gateway.
5. The satellite of claim 2, wherein said payload architecture allocates return channels among said plurality of first spot beams by switching and filtering of said plurality of first spot beams.
6. The satellite of claim 4, wherein said payload architecture selects combined returned signals from among said one of said plurality of first spot beams

selected to contain a gateway by power dividing and switching said plurality of first spot beams.

7. A multi-beam satellite comprising:

an input section to receive a plurality of first spot beams;

an output section to transmit a plurality of second spot beams; and

a payload architecture coupled between said input section and said output section, said payload architecture flexibly and selectively switching and filtering said plurality of first spot beams received at said input section and routing the switched and filtered to be said plurality of second spot beams transmitted by said output section so as to perform testing of each of said plurality of first spot beams and each of said plurality of second spot beams.

8. The satellite of claim 7, wherein said payload architecture selectively switches said plurality of first spot beams to allow any uplink beam to act as a gateway beam.

9. The satellite of claim 7, wherein said testing is performed using test signals from a single ground station.

10. The satellite of claim 7, wherein said payload architecture allows connectivity, for test purposes only, of one of said plurality of second spot beams corresponding to a cell with one of said plurality of first spot beams corresponding to said cell.

11. The satellite of claim 9, wherein said testing operates in conjunction with a control system to reposition said at least one first antenna and said at least one second antenna so that each one of said plurality of first spot beams and said plurality of second spot beams can be tested from said single ground station.

12. The satellite of claim 7, wherein said plurality of first spot beams includes spot beams corresponding to primary cells and secondary cells.

13. The satellite of claim 12, wherein said testing includes testing of first spot beams corresponding to a secondary cell.

14. A method of testing a multi-beam satellite, said method comprising:  
receiving a plurality of first spot beams at said satellite;  
transmitting a plurality of second spot beams from said satellite;  
switching said plurality of first spot beams to allow connectivity of a first spot beam in a cell with a second spot beam in said cell; and

sending a test signal from a single ground station on said first spot beam and said second spot beam to test said first spot beam and said second spot beam.

15. The method of claim 14, further comprising repeating said step of sending a test signal for each one of said plurality of first spot beams and each one of said plurality second spot beams from said single ground station.

16. The method of claim 15, wherein said satellite comprises a first antenna or antenna set receiving said plurality of first spot beams and a second antenna or antenna set transmitting said plurality of second spot beams, and said first antenna or antenna set and said second antenna or antenna set are repositioned for each pair of one of said plurality of first spot beams and one of said plurality of second spot beams corresponding to a cell.

17. The method of claim 15, wherein said satellite comprises one or more shared antenna apertures receiving said plurality of first spot beams and said plurality of second spot beams, and said shared antenna aperture is repositioned for each pair of

one of said plurality of first spot beams and one of said plurality of second spot beams corresponding to a cell.